Metropolitan Area Planning Council

Climate change impacts and preparedness at the local level

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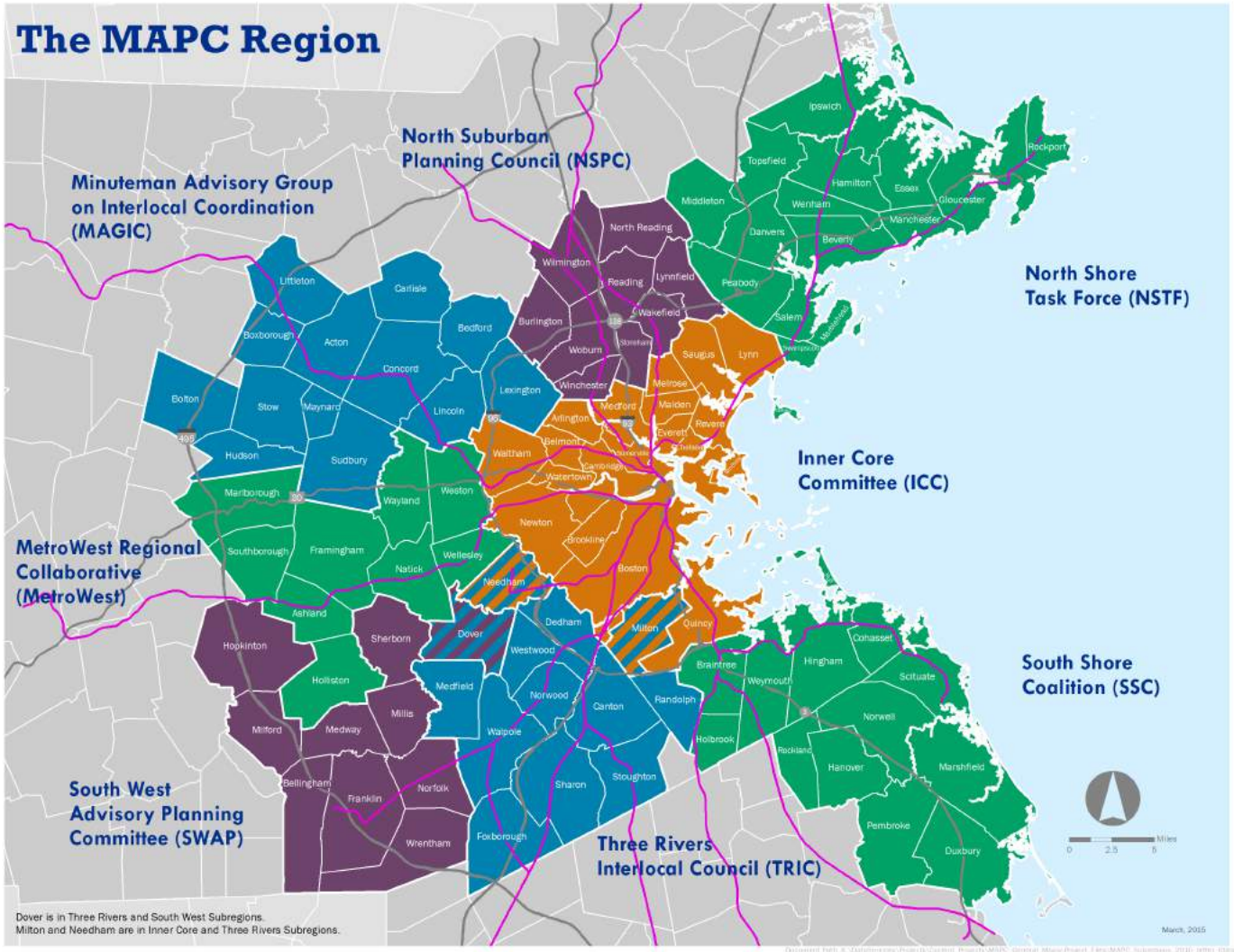
Smart Growth & Regional Collaboration



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101 municipalities

1,440 square miles

Nearly 3.2 million residents

1.8 million jobs (2010 Census)

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MetroFuture Vision

- Efficient transportation systems
- Conservation of land and natural resources
- Improvement of the health and education of residents
- An increase in equitable economic development opportunities for prosperity

Climate Change

In our region

Sea Level Rise

9.4 in. since 1921

8 in. – 6.5 ft. anticipated by end of century

Temperature Change

Hotter summers. Ann. ave. 1.8°F since 1970

Warmer winters. 1.3°F per decade

12 days over 90°F now. 31 - 62 by 2100

Precipitation

10 % increase in 50 years, mostly in winter

Fewer and more severe storms anticipated

Ocean Acidification

Impacts marine ecosystem health

Source: MAPC Regional Climate Change Adaptation Strategy, Boston Climate Ready

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MAPC Clean Energy

1. Regional Energy Projects

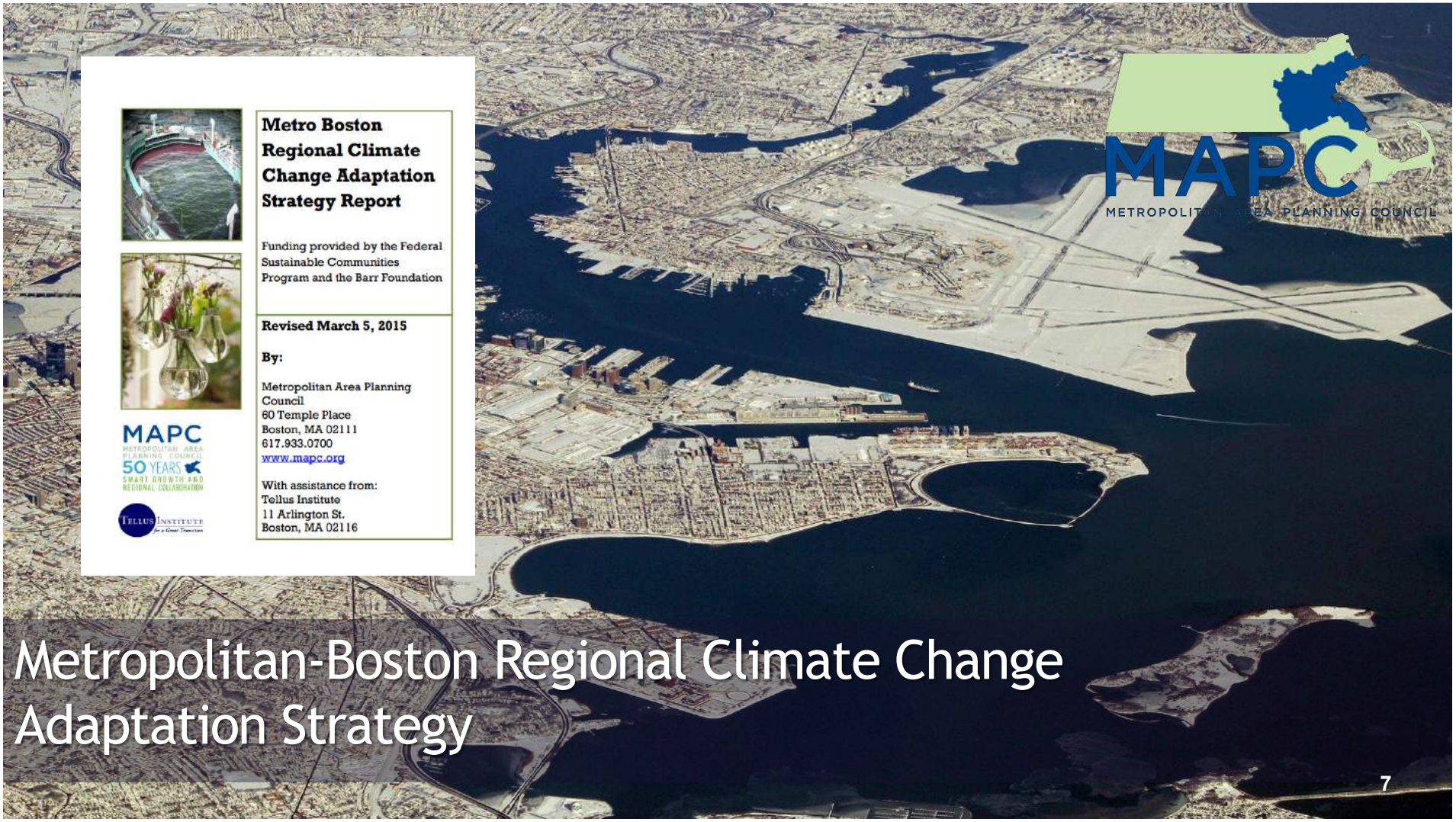
- ESCO Procurement
- Regional Solar Initiative
- LED Streetlight Purchasing Program
- Community Aggregation
- Hybrid Conversion Technology
- Energy Resiliency

2. Local Energy Action Program

- Connecting municipalities with incentives + plug-and-play programs
- Community energy and climate baselining, planning, and strategizing
- Outreach programming and education

3. Energy Technical Assistance

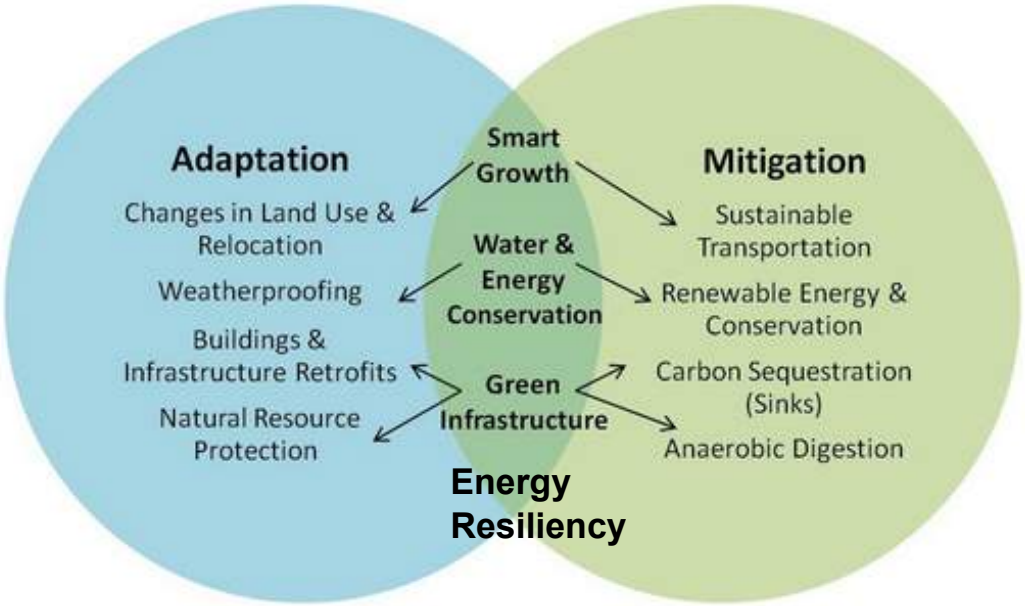
- Grant Writing
- Green Communities Designation
- Methane Leaks
- Solar Permitting and Zoning
- State and Local Policy



Metropolitan-Boston Regional Climate Change Adaptation Strategy

Regional Climate Change Strategy : Objectives

Sector	Subtopic	Objectives
Built Environment	Development, Green Infrastr., Tree Canopy	1) New development/redevelopment designed to adapt to climate impacts (heat, precipitation, etc.)
	Development	2) Redevelopment located outside of the highest hazard areas
Natural Resources	Protection	3) Natural functions of ecosystems, shorelines and critical habitat areas will be restored
	Management	4) Conserve and manage habitats to support healthy fish, wildlife and plant populations and ecosystem functions
	Restoration	5) Restore ecosystem processes to increase capacity to adapt
Coastal Zone	Protection, Storm Assess.	6) Coastal areas resilient to climate change impacts
Key Infrastructure	Energy, Water/WW/SW, Transportation, Green Infrastructure	7) Resilient transportation, water/wastewater, and energy infrastructure
	Roads & Crossings	8) All existing tide and flood control structures assessed for flood control
Local Govt./ Econ.	Asset Mgmt & Capacity	9) Local and regional asset management preparation and monitoring
Human Health & Welfare	Vector Diseases, Vulnerable Populations	10) A public protected from extreme climate change health impacts, with particular focus on vulnerable populations



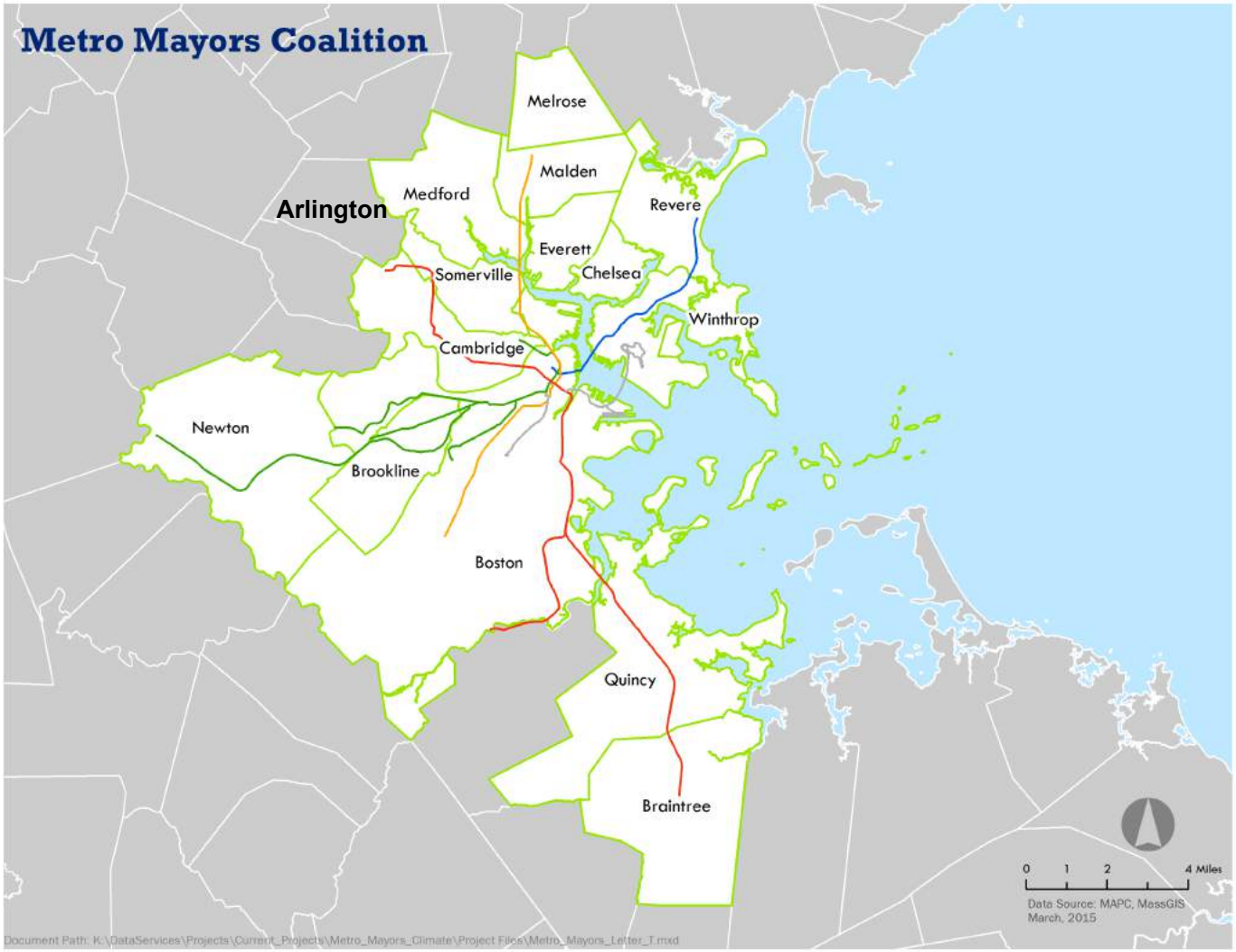
Source: Regional Climate Change Adaptation Strategy, MAPC, 2015

Winter 2015

Boston, Massachusetts Annual total snowfall to date:

110.3"

(Boston Globe, 3/22/15)



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Metro Mayors Coalition Region:

14 Municipalities

Nearly 1.4 million (2010 Census); 43% of the MAPC region population

150 square miles, roughly 10% of the MAPC region land area

Metro Mayors Coalition Climate Preparedness Commitment

On May 13, 2015, the Metro Mayors Coalition convened to sign a Climate Preparedness Commitment.

The Coalition's mayors and city and town managers signed the document, and received support from:

- Executive Office of Energy and Environmental Affairs (EOEEA)
- Executive Office for Housing and Economic Development (EOHED)
- MassDOT
- MWRA
- Massport
- EPA Region I

Metro Mayors Coalition Climate Preparedness Summit: May 13, 2015

Metro Mayors Coalition Climate Preparedness Taskforce

The Coalition launched a Taskforce to address vulnerabilities in the region's shared critical infrastructure.

The Taskforce is working to:

- **help to coordinate a regional and cross-governmental effort,**
- **ensure coordination and integration of existing and planned mitigation and resiliency work, to optimize the outcomes of both efforts,**
- **work fairly, equitably, and inclusively to ensure that vulnerable populations have access to protective measures and adaptive capacity in the face of climate change.**

Metro Mayors Coalition Climate Preparedness Summit: May 13, 2015

Metro Mayors Coalition Climate Preparedness Taskforce

Priority Focus Areas

- Capacity Building
- Flooding
- Urban Heat Island Effect

Metro Mayors Coalition Climate Preparedness Taskforce

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Established partnerships and recent activities:

- Institute for Sustainable Communities: Local Climate Vulnerability Assessment Workshop for Metro Mayors municipalities
- City of Quincy: Hydrodynamic Modeling and Community Education Program
- City of Boston: Boston Climate Preparedness Planning Initiative
- Trust for Public Land: Metro Boston Climate Smart Cities Project

THE TRUST for PUBLIC LAND

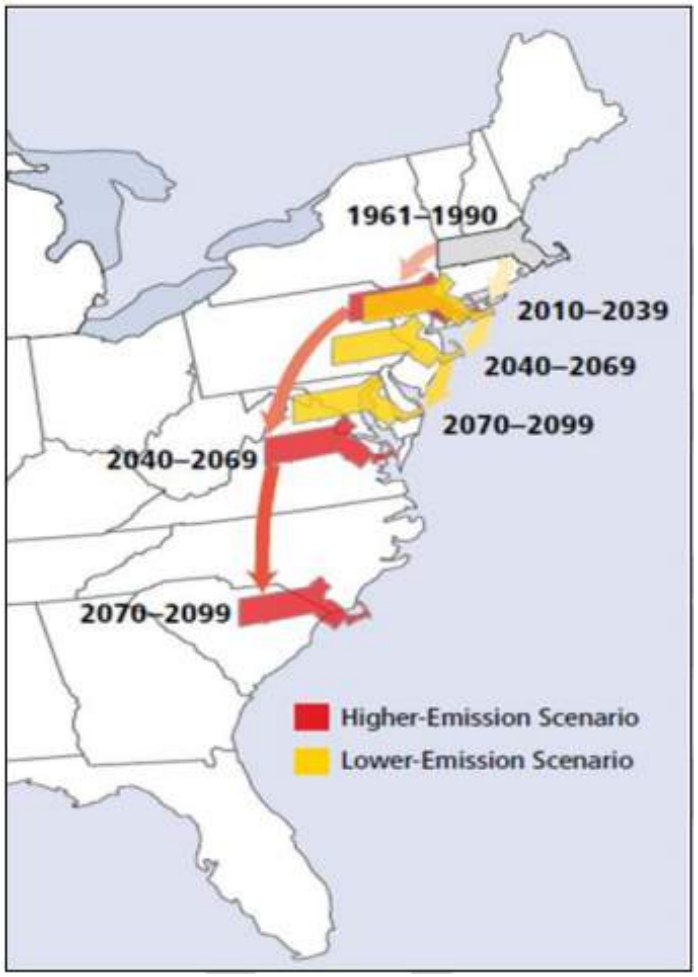
In partnership with the City of Boston

CITY *of* QUINCY

Metro Mayors Climate-Smart Region
Climate Planning for Green Infrastructure

Conventional (Gray) Infrastructure	Green Infrastructure
Singe function	Multi-functional and aesthetically pleasing
Manufactured materials	Mostly natural materials
Transports stormwater away from site	Manages stormwater on site
Concentrates stormwater and pollutants	Naturally treats and disperses pollutants
Roads built for cars only	Roads that accommodate bicycles, pedestrians, and the natural system
Electricity from fossil fuels	Electricity from renewable energy
Cookie-cutter approach, no room for creativity or complementariness	Unique and complimentary to other types of infrastructure

Green Infrastructure



Source: Confronting Climate Change in the U.S. Northeast: Science, Impacts, and Solutions, NECIA, 2007.

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As depicted in the 2007 Northeast Climate Impacts Assessment report (NECIA, 2007):

Summer temperatures in our region will feel like New Jersey or Maryland by mid-century and Virginia or the Carolinas by late century.

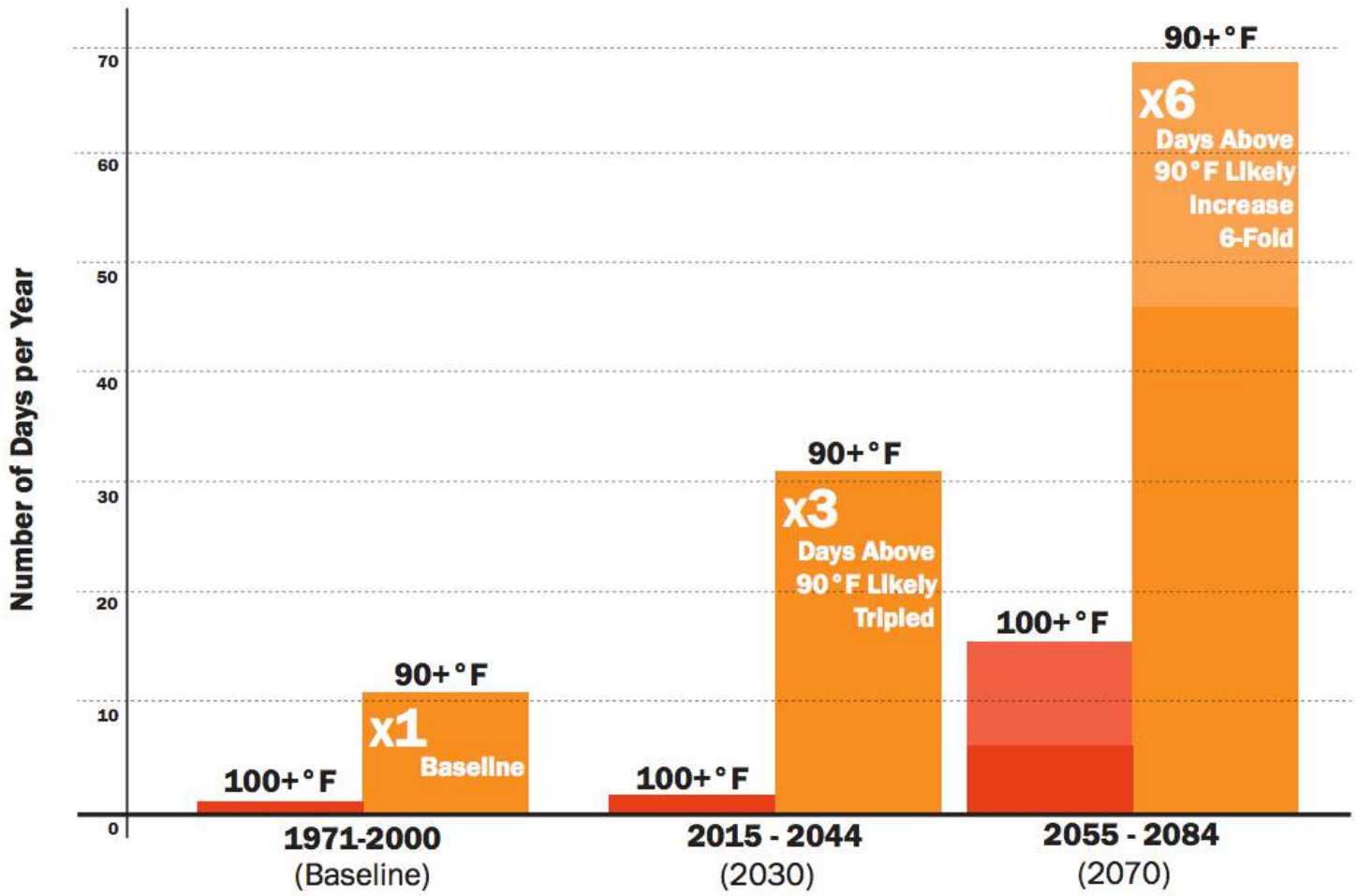
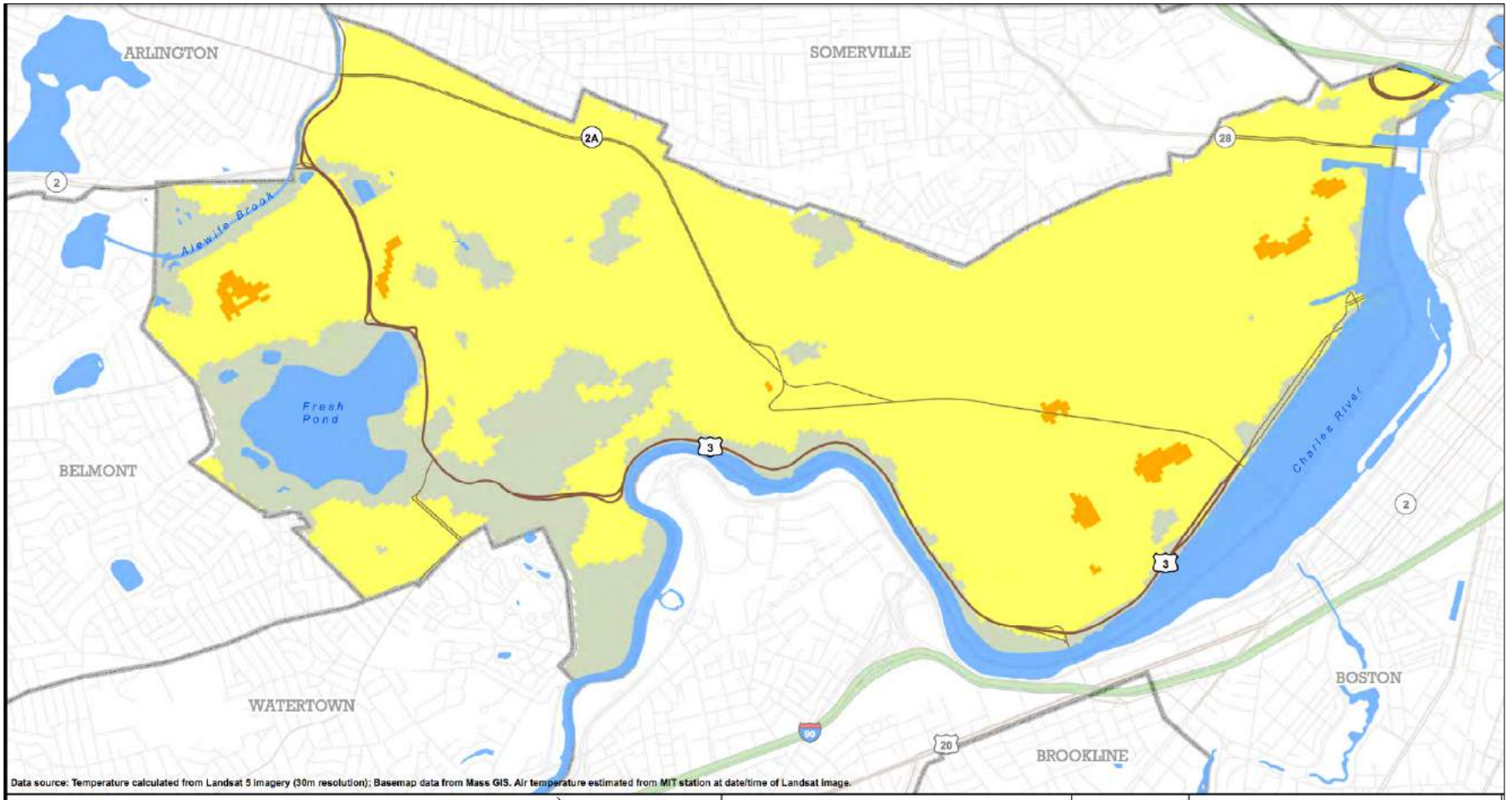


Fig. 15 **Number of days above 90°F** (Source: Kleinfelder based on ATMOS research, November 2015)



Data source: Temperature calculated from Landsat 5 Imagery (30m resolution); Basemap data from Mass GIS. Air temperature estimated from MIT station at date/time of Landsat Image.

LEGEND
Estimated Ambient Temperature (°F)

- ≤80
- 80 - 90
- 90 - 103
- 103 - 124
- >124

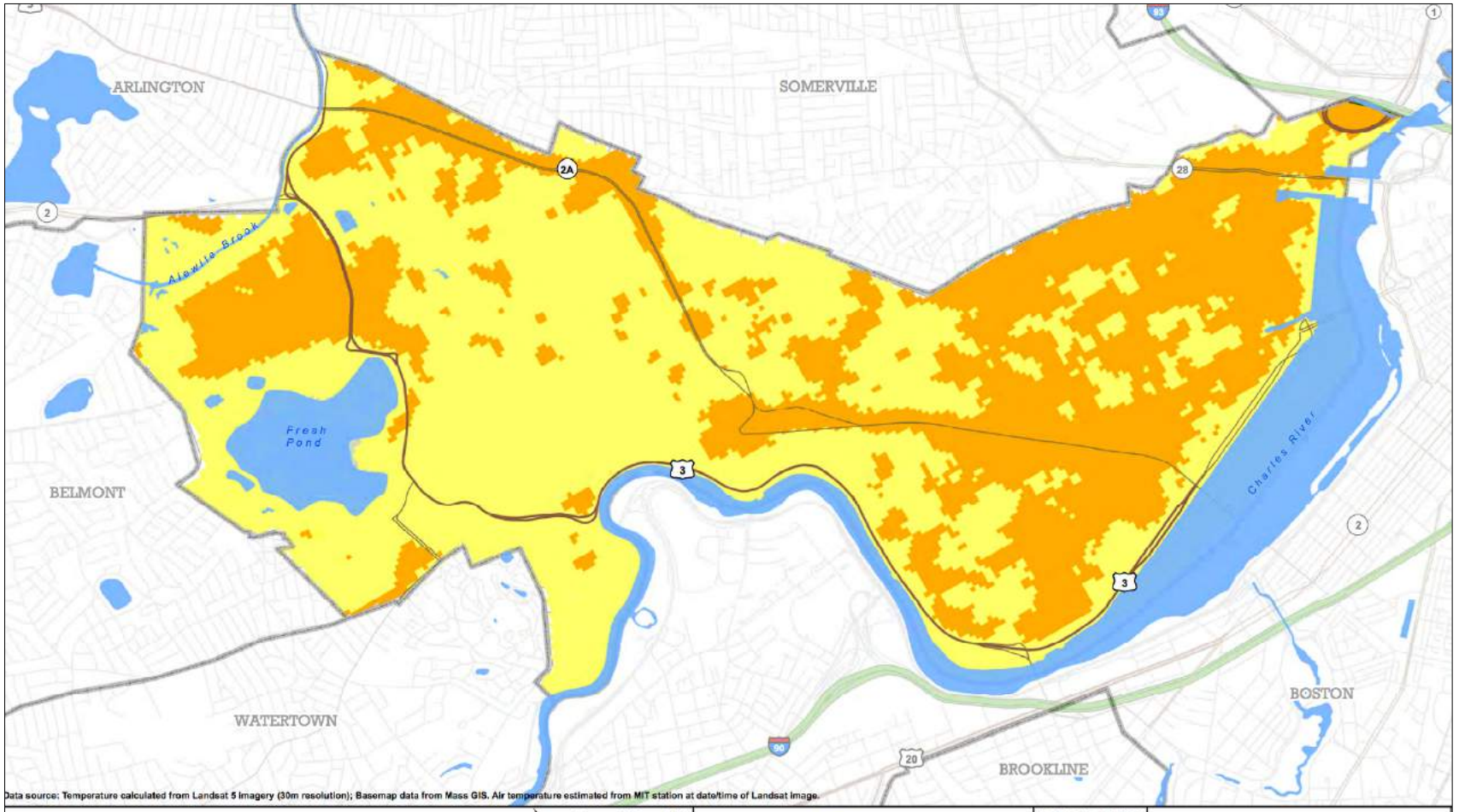
0 1,000 2,000
Feet
Locations are approximate

KLEINFELDER
www.kleinfelder.com

PROJECT NO.	20100259
DRAWN:	04/04/2015
DRAWN BY:	AW
CHECKED BY:	NB
FILE NAME:	Map 1-AmbientAir_2015.mxd

PRESENT CONDITIONS AMBIENT AIR (83°F)

Climate Change Vulnerability Assessment
Cambridge, Massachusetts



Data source: Temperature calculated from Landsat 5 imagery (30m resolution); Basemap data from Mass GIS. Air temperature estimated from MIT station at date/time of Landsat Image.

LEGEND
Estimated Ambient Temperature (°F)

- ≤80
- 80 - 90
- 90 - 103
- 103 - 124
- >124

0 1,000 2,000
Feet
Locations are approximate

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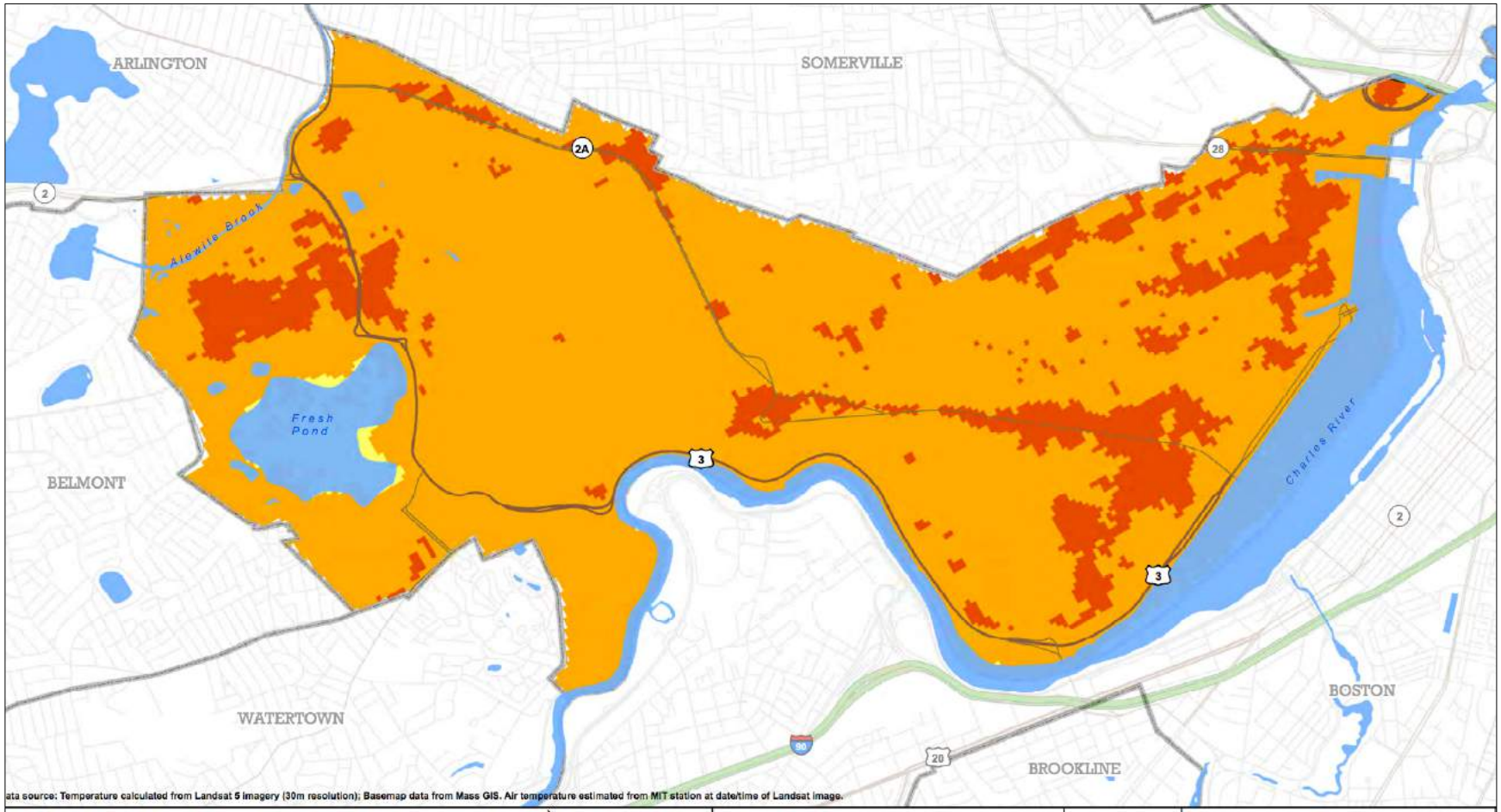
PROJECT NO.	20100259
DRAWN:	04/04/2015
DRAWN BY:	AW
CHECKED BY:	NB
FILE NAME:	Map 2-AmbientAir_2030.mxd

2030S SCENARIO
AMBIENT AIR (90°F)

Climate Change Vulnerability Assessment
Cambridge, Massachusetts



ata source: Temperature calculated from Landsat 5 imagery (30m resolution); Basemap data from Mass GIS. Air temperature estimated from MIT station at date/time of Landsat image.

LEGEND
Estimated Ambient Temperature (°F)

≤80	103 - 124
80 - 90	>124
90 - 103	

0 1,000 2,000
Feet
Locations are approximate

KLEINFELDER
www.kleinfelder.com

PROJECT NO.	20100259
DRAWN:	04/04/2015
DRAWN BY:	AW
CHECKED BY:	NB
FILE NAME:	Map 3-AmbientAir_2070.mxd

2070S SCENARIO
AMBIENT AIR (100°F)

Climate Change Vulnerability Assessment
Cambridge, Massachusetts

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Resilient Quincy

Planning and Preparing for Coastal and Climate Change in Quincy

Resilient Quincy

Team:

- Metropolitan Area Planning Council
- City of Quincy Planning Department
- Boston University City Planning & Urban Affairs Program

Project:

Pilot development of a detailed vulnerability assessment for an urban, coastal community.

Climate Change

Vulnerabilities and Protection

Natural Resources

Wetlands, tree canopy, green space

Flood absorption, absorption, carbon sequest.

Coasts

27 miles of shoreline

Erosion, shore damage, habitat loss, pollution

Development and Infrastructure

Update old. maintain + protect new.

Community Health

Some populations more vulnerable

Economy

4,000 businesses, 50,000 emp. $3B wages

Potential short term and long term impacts

Source: Quincy Open Space Plan, ES-202, MAPC Regional Climate Change Adaptation St.

Climate Change

Assets

Natural Resources

Wetlands

Tree canopy(see open space plan)

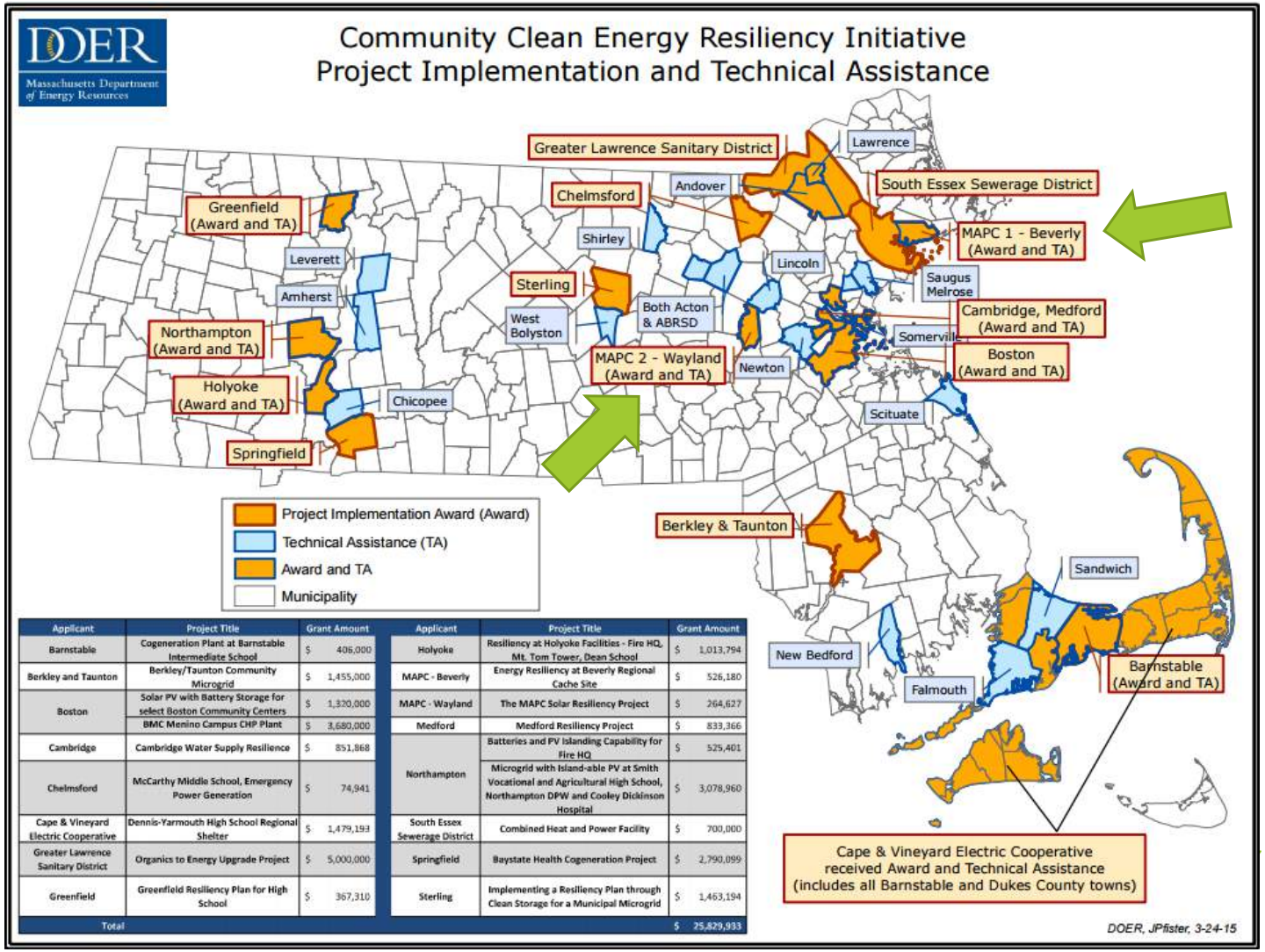
Engineered structures

Offer coastal protection

39 inventoried

seawalls, jetties, revetments

Source: Quincy Open Space and Recreation Plan, MA Coastal Infrastructure Inventory and Assessment Project



Applicant	Project Title	Grant Amount
Barnstable	Cogeneration Plant at Barnstable Intermediate School	$ 406,000
Berkley and Taunton	Berkley/Taunton Community Microgrid	$ 1,455,000
Boston	Solar PV with Battery Storage for select Boston Community Centers	$ 1,320,000
	BMC Menino Campus CHP Plant	$ 3,680,000
Cambridge	Cambridge Water Supply Resilience	$ 851,868
Chelmsford	McCarthy Middle School, Emergency Power Generation	$ 74,941
Cape & Vineyard Electric Cooperative	Dennis-Yarmouth High School Regional Shelter	$ 1,479,193
Greater Lawrence Sanitary District	Organics to Energy Upgrade Project	$ 5,000,000
Greenfield	Greenfield Resiliency Plan for High School	$ 367,310

Applicant	Project Title	Grant Amount
Holyoke	Resiliency at Holyoke Facilities - Fire HQ, Mt. Tom Tower, Dean School	$ 1,013,794
MAPC - Beverly	Energy Resiliency at Beverly Regional Cache Site	$ 526,180
MAPC - Wayland	The MAPC Solar Resiliency Project	$ 264,627
Medford	Medford Resiliency Project	$ 833,366
Northampton	Batteries and PV Islanding Capability for Fire HQ	$ 525,401
	Microgrid with Island-able PV at Smith Vocational and Agricultural High School, Northampton DPW and Cooley Dickinson Hospital	$ 3,078,960
South Essex Sewerage District	Combined Heat and Power Facility	$ 700,000
Springfield	Baystate Health Cogeneration Project	$ 2,790,099
Sterling	Implementing a Resiliency Plan through Clean Storage for a Municipal Microgrid	$ 1,463,194
Total		$ 25,829,933

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CCERI

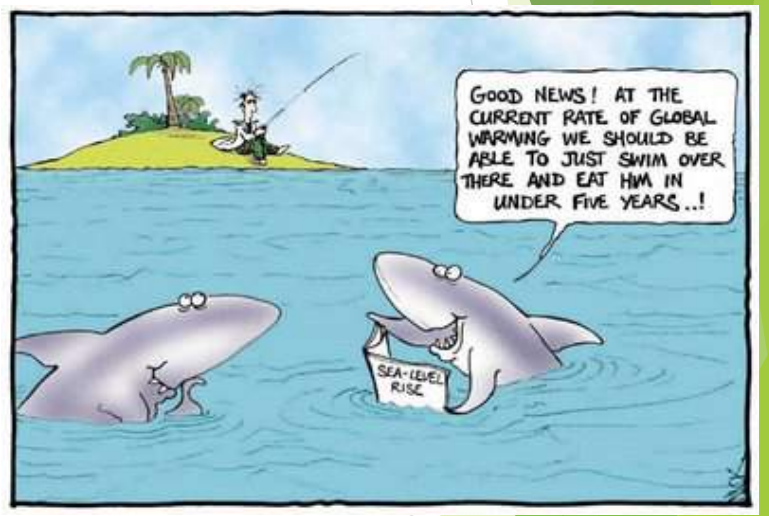
MA's $40 million grant program for municipal energy resiliency projects at critical facilities.

Funding for clean energy technology solutions aimed to protect communities from grid outages due to severe climate events.

2 MAPC Projects: Wayland and Beverly

What Can Cities and Towns do?

- Climate vulnerability assessment
- Climate adaptation plan
- Green infrastructure
- Energy resiliency
- Mitigation+ (net zero?)
- Climate lens (i.e. master planning, housing, hazard mitigation)
- Community Compact
- Think regionally





Questions?

Sources (clockwise starting top left): City of Portland, City of Philadelphia, Cammy Peterson, City of Quincy

Thank You!

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